

# **APPLICATION FOR UNITED STATES PATENT**

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**Invention:**    **LOST PERSON NOTIFICATION SYSTEM**

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## LOST PERSON NOTIFICATION SYSTEM

### CROSS-REFERENCE TO RELATED APPLICATIONS

The present application derives priority from U.S. Provisional Patent Application 60/487,552  
10 filed: July 15, 2003.

### BACKGROUND OF THE INVENTION

#### 1. Field of the invention

The invention relates to the displaying of an image of a lost person in an emergency situation  
15 and, more particularly, to a system for rapidly decoding and displaying an electronically stored image,  
of a lost person, on a plurality of remotely located display devices.

#### 2. Description of the Background

The risk of having children or disabled adults lost or abducted during a visit to a public or  
20 private place is a concern for the host, parents, guardians and other responsible persons. The risk is  
increased in places where large numbers of persons are moving about freely, such as airports, shopping  
malls, stadiums and amusement parks. Facilities having activities oriented toward children, such as  
sports and entertainment complexes pose a particular concern because they operate in large areas with  
multiple exits. Children can be manipulated or persuaded to make poor decisions which compromise  
25 their safety. Experts have reported that children abducted by certain types of perpetrators have a much  
greater chance of being found alive if they are found within a short period of time. In order to maximize

5     their safety, it is desirable to quickly locate lost children.

      The owners and operators of such facilities spend time and effort to provide security in the form of controlled entrances and exits, video monitoring, security employees and other measures.

Presumably, the presence of well planned and implemented security measures at a particular facility acts as a deterrent against those persons having criminal intent with regard to the abduction of susceptible  
10    persons. It is an advantage to have somewhat conspicuous security measures so that visitors to the premises are aware of precautions being taken. In addition to the security measures which generally relate to monitoring activity on the premises, it is possible for responsible individuals to take steps to reduce the risk of loss or abduction, for a child or disabled person. Identification tags or badges are  
15    or disabled person, the responsible person may give particular instructions in the event of an emergency and prepare a plan for a place to meet if persons become accidentally separated. Electronic systems have been developed to assist a responsible person in locating their charge. U.S. Patent No. 5,337,041, to Friedman, discloses an audible alarm to be worn by a child, which can be activated remotely, by a guardian. Various electronic systems have been developed to rapidly communicate  
20    information in other types of emergency situations. U.S. Patent No. 5,561,412, to Novak, discloses a hospital nurse calling system which logs patient information and automatically detects the presence of a nurse, who has responded to the call. U.S. Patent No. 5,633,621, to McDonald discloses a system for displaying information describing the location of non-ambulatory persons within a building, when an evacuation is necessary. U.S. Patent No. 5,686,886, to Stensey, discloses a neighbor alert system

5 whereby a person having difficulty may send a signal indicating their location.

There remains a need for a system which can be controlled and operated by a responsible person to rapidly display notification to security personnel and to bystanders that a child or disabled person has become separated from their guardian or responsible person. Preferably, such a system would be capable of simultaneously displaying notification information near each exit of the facility and  
10 at other dispersed locations, such notification including an image of the lost person showing their clothing and their face.

#### SUMMARY OF THE INVENTION

It is an object of the present invention to provide a method and an electronic system for rapidly  
15 and prominently displaying a notification of a lost person, inclusive of an image of the lost person (both face and clothing), at a plurality of dispersed locations.

It is another object of the present invention to provide an electronic system which can be activated by a guardian or responsible person to transmit and display information from a medium carried and controlled by the guardian or responsible person.

20 It is another object of the present invention to provide a system which can rapidly and prominently display an image of a lost person near all premises exits and at other locations.

It is another object of the present invention to provide a system which maintains personal image and other data only in a medium controlled by the guardian or responsible person until the guardian or responsible person transmits the information.

5           In accordance with the stated objects there is provided a lost person notification method and system comprising a camera for photographing a person and for recording one or more images of the person. The system includes means for collecting and recording identifying information related to the person and to another person who is a responsible person, such as a parent or guardian. Means are provided for transferring the recorded images and identifying information to a portable storage medium.

10          Typically, the photographs would be taken and the identifying information would be collected when a person, accompanied by a responsible person, enters the premises of a facility such as a stadium, entertainment center or shopping mall, at the commencement of a visit. If entry into the facility involves ticketing, registration or the like, the collection of recorded images and information would generally be accomplished at the same time. The portable storage medium bearing the recorded images and

15          identifying information would be given to the responsible person and may be carried by the responsible person for the duration of the visit to the facility.

          In the event that the person and the responsible person become separated during the visit to the facility, the responsible person may use the portable storage medium to notify security personnel and bystanders that assistance is needed to locate a lost person. In order to accomplish the notification, the

20          system includes manually operable means for transferring the recorded images and information from the portable medium to a system server. It is intended that a plurality of such manually operable means would be dispersed throughout the area of the facility so that the responsible person would have quick access to such means regardless of their location within the facility. The system server has processing software and is programmed to selectively process said recorded images and identifying information in

5 a programmed operation to log the recorded images and identifying information and to produce an  
output including one or more images of the person. The system also includes means for receiving and  
displaying said output at a plurality of remote locations simultaneously for perception by security  
personnel and bystanders. It is intended that the displayed output would include images showing the  
face and the clothing of the person and may also include an alarm sound for drawing attention to the  
10 displayed images. Security personnel and bystanders would be able to help locate the person matching  
the image displayed by the system.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features, and advantages of the present invention will become more apparent  
15 from the following detailed description of the preferred embodiment and certain modifications thereof  
when taken together with the accompanying drawings in which:

FIG. 1 is a block diagram of the registration process.

FIG. 2 is a block diagram of the emergency notification process.

FIG. 3 is a smart card

20 FIG. 4 is a flash drive

FIG. 5 is a personal computer with built-in display monitor

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a notification system and method for alerting security personnel and  
25 bystanders of an emergency situation regarding a missing child or disabled person. The invention

5 generally includes a registration subsystem as shown in FIG 1, and a notification subsystem as shown in FIG. 2.

Referring to FIG. 1, the registration subsystem 10 includes a digital camera 12, an information form 14, a data handler 16 and a portable storage medium 18. The registration subsystem 10 is preferably installed at facilities which receive crowds of visitors who move about freely during their visits, particularly facilities which attract children, such as at ticket booths or guest services offices. It is intended that persons visiting the facility, in the company of a supervising responsible person, such as a parent or guardian, would register for the protection offered by the system of the present invention. The camera 12 is used to photograph the person, and the information form 14 is completed to collect identifying information including name, address and phone number of the person and of their guardian, and cell telephone number if one is available. It is preferred that the photographs include a close up shot of the face and a full body shot showing the clothing being worn. In the preferred embodiment, the person's fingerprints are taken as well. The information form 14 is completed in machine readable format, and the data handler 16 includes an integrated keyboard 11 for inputting the information. A suitable camera 12 is the Intel®, Pro Video PC Camera. The identifying information is collected on the form 14 and is entered to the data handler 16 from its keyboard 11. Fingerprints may be taken in machine readable form with a fingerprint sensor 17, such as The 5<sup>th</sup> Sense TM, Combo Peripheral manufactured by Veridicom of Sunnyvale California, which also includes a smart card reader. The camera 12 and the fingerprint sensor 17 are connected to the data handler 16 by conventional means, such as a standard USB cable. The NCR Easy Point TM 45 computer is a suitable data handler 16.

25 In operation, paper forms with identifying information 14 are provided for registration, with

5 blanks to be filled in by the guardian. An attendant photographs the person and operates the fingerprint sensor 17 to obtain a fingerprint. The attendant enters the information from the form, through the keyboard, and the digital photograph, identifying information and fingerprint are compiled into a digital record by Data Handler 16. The record is then output and stored on a portable storage medium 18. In the preferred embodiment, the portable storage medium 18 is a conventional smart card as shown in  
10 FIG. 3, and an associated smart card reader/writer 20.

Referring to FIG. 3, the smart card 19 is a credit card sized device which contains a microprocessor and a nonvolatile read/write memory, referred to as EEPROM (electrically erasable programmable read only memory). A suitable smart card is a GemXpresso Pro Card with 64kB of RAM. The smart card reader/writer 20 may be the widely available Micro Innovations USB Smart  
15 Card Reader/ Writer system, Mfg Part#: USB725R. The attendant inserts the smart card 19 into the smart card reader/writer 20.

Referring back to FIG.1, Data Handler 16 includes resident software which compresses the digital photograph and fingerprint, and compiles the compressed digital photograph, identifying information and fingerprint into a digital record which is then stored on the portable storage medium 18  
20 (e.g., on smart card 19). The size of the raw fingerprint image is 90K bytes, which is compressed into a standard JPG format file until it occupies approximately 15K bytes. The image from the full body shot compresses into a standard JPG file of approximately 14K bytes. The image of the person's face is compressed until it occupies approximately 30K bytes. The greater compression of the image of the full body shot results in some loss of detail but the image is intended only for illustration of the clothing  
25 being worn. The image of the person's face is compressed as little as possible. Together, the two JPG



5 photograph images, the fingerprint JPG image and the text file containing identifying information are stored on the GemXpresso Pro Card 19. Standard image processing drivers are used, along with drivers provided in the CONFIRMA-EK software development package provided by Veridicom for fingerprint image extraction, and drivers in the GemXpresso RAD III Development Suite Kit from Gemplus, to interface with their smart card.

10 It is contemplated that other portable storage media 18, which have a larger capacity, may be used to reduce the amount of data compression required to be performed. A flash memory, such as the Thumbdrive TM Smart, shown in FIG. 4, manufactured by Trekstor USA of San Ramon, California allows for 16M bytes of storage. In spite of the relatively large data storage capacity, this device is small enough to be easily carried by a guardian during a visit to a facility. The use of a larger capacity  
15 portable storage medium may allow for data for more than one person to be stored on the same portable storage medium.

Once the attendant has transferred the recorded images and identifying information, the guardian may wish to reinsert the portable storage medium 18 (e.g., smart card 19) back into its reader  
20 to verify the presence of the recorded images and data.

20 In the preferred embodiment, the data handler 16 is also provided with a label printer 21 for printing the person's name on a label, which may then be affixed to the portable storage medium 18. At the conclusion of a visit, the guardian may return the portable storage medium 18 to the attendant, to be erased and reused. It is an advantageous feature of the system that personal information is not recorded in a central memory to preserve privacy.

25 In the event that a guardian discovers that the person is missing, during a visit to a facility, the

5 notification subsystem may be activated for alerting security personnel and bystanders to assist in locating the missing person.

As shown in FIG. 2, the notification subsystem 50 components include a plurality of reporting stations 52 for retrieving the recorded images and identifying information from the portable storage medium 18 and a system server 54. Each reporting station 52 includes conventional hardware for transferring the recorded images and identifying information to the system server 54. It is contemplated that the system server 54 may have other uses not related to lost person notification and to that end, may have processing tasks running. When a portable storage medium 18 is inserted into any reporting station 52, the server 54 immediately processes the identification record stored thereon, inclusive of photograph and identifying information to produce an output which is then displayed at a plurality of locations throughout the facility. In the preferred embodiment, the reporting stations 52 are placed at locations approximately 100 feet apart so that individuals are never farther than 50 feet from one of the stations 52 and are always able to quickly access a reporting station 52. In the preferred embodiment, each reporting station 52 includes a conventional personal computer 60 with on-board audio card and a smart card reader and WiFi adapter. The smart card reader is connected to the personal computer and the output of the computer is connected to the WiFi adapter. The guardian may insert the smart card 19 containing the stored images and identifying information, into the smart card reader. The personal computer 60 is configured and programmed to detect the insertion of the smart card into the smart card reader, retrieve the stored data record and transmit it as a signal from the WiFi adapter. A suitable smart card reader is a model DT3000 from Mako Technologies, of Delray Beach, Florida which may be connected to the personal computer by serial RS-232 cable. A suitable WiFi adapter is

5 the MA101 802.11b Wireless USB Adapter from Netgear of Santa Clara, California, connected to the personal computer 60 by USB cable to the USB port of the personal computer 60. The WiFi adapter is a standard wireless protocol used for local area networks (LAN) and includes encryption protocols for security purposes. A suitable personal computer 60 is a 110 STEALTH, shown in FIG. 5, from Instruments & Equipment Co. of Sparta, New Jersey. It is intended that the signal transmitted from the  
10 WiFi adapter would include a marker identifying the station from which the report originated. It is possible to configure the system with a wireless smart card which can be read without requiring physical contact with the reader. If the system is configured with portable storage media 18 having data of more than one person, the card reader can be configured to include a set of buttons to provide for the selection of the data of a particular missing person for transmission to the system server.

15 The server 54 is equipped with a wireless access point (WAP) device (which may be integral or connected to the system server 54 by a USB port) for receiving the transmission from the WiFi adapter of personal computer 60. The system server 54 is a programmable computer which is configured and programmed to continually monitor the WAP device for incoming data signals and to immediately process any incoming signals. Processing includes logging the input and producing an  
20 output that interrupts processing tasks, decompiles the record, and outputs the associated images, identifying information and a set of control commands, from the WAP device. A suitable WAP device is the MR814 WAP from Netgear and a suitable system server is the NCR EasyPoint TM 45PC. In the preferred embodiment, the WAP device is connected to the LAN network interface of the system server 54. It is noteworthy that the functions of the system server 54 and the registration data handler  
25 16 may be performed by a single NCR EasyPoint TM 45PC having separate software running

5 simultaneously.

Once the system server 54 outputs the images, identifying information and control commands through the WAP device, the information is received and displayed at a plurality of stations 52 at locations throughout the facility. In the preferred embodiment, the output signal from the WAP device is received by the personal computer 60 with WiFi adapter. The display of the images and identifying information is accomplished by a video display monitor 63, a public address amplifier 61 and a power  
10 horn (speaker) 62. A suitable personal computer 60 is the 110 STEALTH, shown in FIG. 5, from Instruments & Equipment Co., which includes a built-in monitor 63. A suitable public address amplifier 61 is the model #32-2001 20W Public Address Amplifier from Radio Shack and a suitable powerhorn 62 is model #40-1440 Indoor/Outdoor Powerhorn also from Radio Shack. In order to provide the  
15 most economical system, the stations for reporting a missing person and the stations for displaying the notification are identical, as this way a single brand of personal computer and WiFi adapter serve the purposes related to reporting and displaying the notification of a missing person. The same need for dispersing the stations throughout the facility for quick access to report a missing person applies to the need for dispersing the stations for displaying the image of the missing person. In the preferred  
20 embodiment, the reporting and display functions share the use of the WiFi adapter and the personal computer. The personal computer 60 is programmed and configured to receive the image and identifying information and to respond to the commands. In the preferred embodiment, the personal computer 60 outputs a standard format WAV file comprising a siren sound stored on its hard drive. The personal computer 60 displays the image of the missing person on monitor 63 and repetitively plays  
25 the siren file and may also play a programmed announcement. In order to accomplish this function, the

5 audio card output of the personal computer 60 is connected to the public address amplifier 61, and the amplifier's output is connected to the powerhorn 62. The immediate area surrounding the station is alerted with the siren sound and announcement, drawing attention to the image of the missing person. It is intended that all of the plurality of stations 52 would display the notification simultaneously. The image display may include the person's name. In the preferred embodiment the system server would  
10 be programmed and configured to alternate the display of images and identifying information, in the event that more than one report of a missing person is transmitted to the system server 54 and to cease the transmission of a particular report of a missing person when so instructed by appropriate manual input. It is anticipated that during times when no missing persons are being reported, the system server 54 would run normal processing tasks comprising the retrieval and transmission of marketing  
15 announcements relating to the activities being conducted at the facility or announcements of general nature. The announcements may include video and audio content. The announcements would be presented by the stations to inform visitors to the facility. However, upon receipt of a lost person notification (with image and identifying information), the rapid alert and display of the image at all of the plurality of stations greatly increases the likelihood that an abductor will abandon an attempted  
20 abduction and that a missing person will be quickly located and returned to a guardian. In the event that a missing person is not quickly located, the image, fingerprint and other information may be provided to law enforcement officials, from the system server.

Another version of the present invention may be practiced without the need for portable data storage media 18. It is contemplated that a person's standard picture identification card could be  
25 carried by a guardian. It is preferred that the system include means to produce a picture identification

5 card, in the event that the person does not have one. This is likely if the person is a child or a disabled adult. It is preferred that the identification card be prepared with the person's name address and phone number, fingerprint image and photograph. Information for the guardian may be included as well. Conventional means are to be used to prepare the picture identification card with a fingerprint image. In the alternate version, the stations would have a standard scanner in place of the smart card reader.

10 The scanner would be connected to the personal computer in conventional fashion. In the event of an emergency separation, the guardian would scan the identification card instead of inserting the smart card in the smart card reader. The system would operate to display an image of the identification card on the display monitors 63.

In the event that one or more of the stations 52 is outside the effective communication range of

15 the wireless LAN, which is approximately 1500 feet when used outdoors, additional WAP devices may be connected to the personal computers 60 at a station or stations within the range and the additional WAP devices may be configured to relay the signals to and from the stations 52 which are out of range. It is also possible to use standard wired communication means, such as standard wired LAN and powerline data means, in place of the wireless system disclosed herein, to connect the

20 stations 52 to the system server 54 which may be preferable for some applications. Although the preferred embodiment includes digital communication means, it will be apparent to those skilled in the art that analog communication may be used to serve the purposes of the present invention, without departing from the spirit of the invention. Other alterations and modifications will be suggested to those skilled in the art and it is understood that all such variations, modifications and changes are intended to

25 come within the scope of the invention as disclosed and claimed herein.